

Porencephalic and Cystic Encephalomalacia Changes Mimicking Arachnoid Cyst on MRI: An Important Diagnostic Pitfall in Children with Static Motor Deficits

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ABSTRACT

Background: CSF-containing intracranial spaces on Magnetic Resonance Imaging (MRI) are frequently labelled as arachnoid cysts, sometimes without careful assessment of mass effect or parenchymal loss. Porencephalic and cystic encephalomalacic changes secondary to perinatal brain injury may closely mimic arachnoid cysts, leading to misdiagnosis and unnecessary neurosurgical referrals.

Patients and Methods: We report a 5-year-old girl with long-standing static spastic left hemiparesis and gait abnormality. Brain MRI demonstrated focal CSF-filled cavities with adjacent parenchymal volume loss and ex-vacuo ventricular dilatation. These findings were initially suspected to represent an arachnoid cyst. Parents consents and the appropriate approval by the ethics committee have been ensured.

Results: Detailed imaging analysis revealed features inconsistent with a true arachnoid cyst and strongly suggestive of porencephalic / cystic encephalomalacic change due to a remote perinatal ischemic insult.

Conclusion: Recognizing porencephalic and encephalomalacic changes is essential to avoid misdiagnosis, unnecessary surgical consideration, and parental anxiety. Clinical–radiological correlation remains fundamental in pediatric neuroimaging.

Keywords: Porencephaly, Cystic Encephalomalacia, Arachnoid Cyst, Cerebral Palsy, Perinatal Brain Injury, MRI Pitfall

INTRODUCTION

Arachnoid cysts are common incidental findings on pediatric brain MRI and are often benign and asymptomatic. However, not all CSF-containing intracranial spaces represent true arachnoid cysts. In children with a history of perinatal brain injury, CSF spaces may instead reflect porencephalic changes or cystic encephalomalacia, representing parenchymal loss rather than a space-occupying lesion [1-4].

Misinterpretation of these findings can lead to incorrect diagnosis,

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unnecessary neurosurgical referral, parental anxiety, and deviation from appropriate rehabilitative management.

This paper presents an illustrative case highlighting this diagnostic pitfall and reviews the imaging features that distinguish porencephalic change from arachnoid cyst.

PATIENTS AND METHODS

A 5-year-old girl was referred for MRI evaluation due to a long-standing gait abnormality. She had a history of static spastic left hemiparesis, with weakness predominantly affecting the lower limb. The motor deficit had been present since early childhood, with no evidence of progression or regression.

Cognitive and social development were appropriate for age. The child was interactive, socially engaged, and communicative. There was no history of seizures or behavioral disturbance.

RESULTS

MRI of the brain (Figure 1) was performed using standard multiplanar and multisequence protocols.

The study demonstrated:

Supratentorial compartment

There is focal volume loss involving the cerebral parenchyma,

predominantly affecting the deep and periventricular white matter, with associated CSF signal replacement.

The CSF-filled space conforms to the area of parenchymal loss and is irregular in shape, following a vascular/white-matter distribution rather than extra-axial cysternal boundaries.

Adjacent mild asymmetric ventricular dilatation is present, consistent with ex-vacuo change.

No mass effect, midline shift, or compression of adjacent structures is seen.

No abnormal cortical thickening or malformation identified.

No evidence of intracranial mass, hemorrhage, or acute infarction.

Posterior fossa

Cerebellar hemispheres and vermis show no focal mass or cystic lesion.

Mild volume asymmetry may be present, likely secondary to supratentorial injury.

Brainstem configuration is preserved with no focal lesion.

Diffusion-weighted imaging

No areas of restricted diffusion, indicating absence of acute ischemia or active pathology.



Figure-1A: Ex-vacuo white-matter volume loss, CSF replacement of brain parenchyma without mass effect

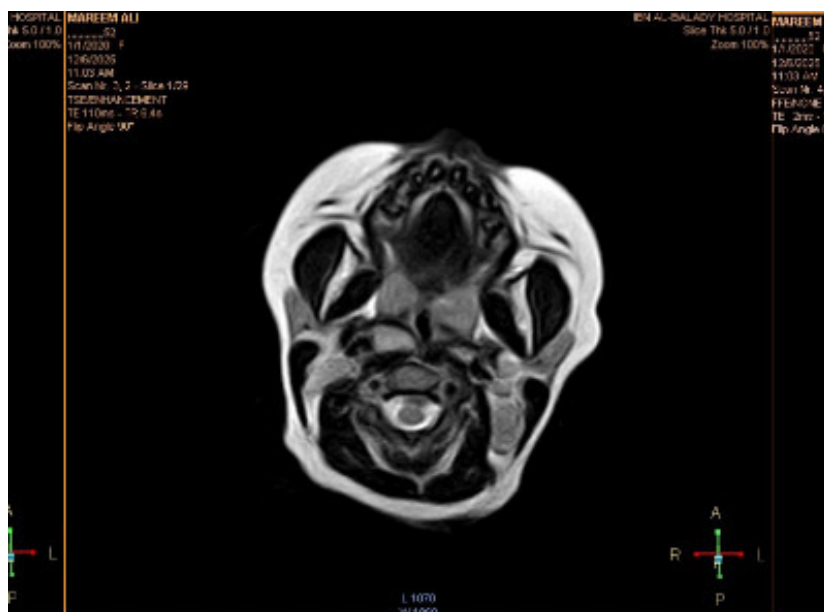


Figure 1B: Porencephalic / cystic encephalomalacic change. Irregular intra-axial CSF cavity following parenchymal loss (not extra-axial).



Figure-1C : Ex-vacuo ventricular asymmetry. Ventricular dilatation proportional to tissue loss, no obstruction



- Loss of brain tissue rather than displacement
- Irregular intra-axial configuration
- Ex-vacuo ventricular dilatation

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